

DESCRIPTIONS OF TWO NEW ACROPOMATID SPECIES OF THE GENUS *MALAKICHTHYS* (TELEOSTEI: PERCIFORMES) FROM AUSTRALIA

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ABSTRACT

Two new species of acropomatid fishes, *Malakichthys levis* and *M. mochizuki*, are described on the basis of specimens collected from the waters around northern Australia. The two species are easily distinguishable from other species of *Malakichthys* by no paired spines on the chin. Although the new species are very similar to each other, they are differentiated by the lamellar septum of first anal-fin pterygiophore (absent in *M. levis*, present in *M. mochizuki*), the counts of the gill rakers on the lower arm (20–22 in *M. levis*, 23–25 in *M. mochizuki*) and the transverse scale rows above the lateral line (6–7 in *M. levis*, 4–5 in *M. mochizuki*).

The genus *Malakichthys* was established by Döderlein in Steindachner and Döderlein (1883) on the basis of *M. griseus* Döderlein, 1883 from Tokyo, Japan. Over the years, *Malakichthys* was considered to include three species, *M. griseus*, *M. wakiyae* Jordan and Hubbs, 1925, *M. elegans* Matsubara and Yamaguti, 1943, and *M. barbatus* Yamanoue and Yoseda, 2001. These species had been recorded only from the western North Pacific (e.g., Matsubara, 1955; Katayama, 1960; Okamura et al., 1985), but an undescribed species of *Malakichthys* was recorded from the eastern Indian Ocean by Gloerfelt-Tarp and Kailola (1984) and Sainsbury et al. (1985).

In this study, we formally describe their undescribed species under the name of *Malakichthys levis* and another new species, *M. mochizuki*, on the basis of specimens collected from the waters around northern Australia.

METHODS

The methods for counts and measurements follow Hubbs and Lagler (1964) except where mentioned below. The count of gill rakers includes all rudiments near the dorsal and ventral ends of the gill arches. Body depth is measured from the base of the pelvic spine to the origin of the dorsal fin. All lengths of the fin rays are measured from the anteriormost in dorsal and anal fins or outermost base in pectoral and pelvic fins of the fin ray to its tip. Upper jaw length is measured from the anteriormost point of the premaxilla to the posteroventral edge of the maxilla. Lower jaw length is measured from the posterior tip of the retroarticular to the ventral edge of the symphysis of the lower jaws. It is difficult to accurately count the transverse scale rows because of the small scales near the anterior bases of the dorsal and anal fins. We took radiographs of all the specimens examined, to examine the shape of the anal pterygiophores. Names of bones follow Suda (1996) except for the use of vomer in place of the prevomer. Institutional abbreviations follow Leviton et al. (1985) with the addition of CBM (Natural History Museum and Institution, Chiba).

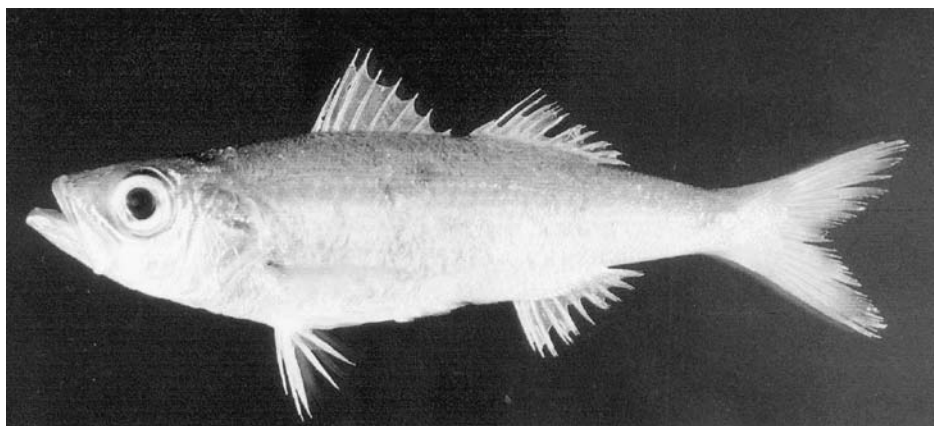


Figure 1. Lateral view of *Malakichthys levis* (paratype, CSIRO CA 1782, 110 mm SL).

***Malakichthys levis* new species**
(Figs. 1,2A,3A,D,G,4A)

Malakichthys sp. Gloerfelt-Tarp and Kailola, 1984: fig. 126 (short description; north western Australia); Sainsbury et al., 1985: fig. 136, (short description; northern and northwestern Australia).

Holotype.—CSIRO H 5188-27 (formerly CSIRO H 5188-18), 142 mm SL, 19° 10.2'S–19° 11.1'S, 116° 16.1'E–116° 20.0'E, (north of Dampier Archipelago, Western Australia), 256 m depth, coll. by D. Evans, demersal trawl, RV MISS PERCEPTION, 27 Oct. 1998.

Paratypes.—Total 32 specimens. All from north and northwest of Australia: AMS I.22807-054 (6 specimens), 96–147 mm SL, 18°32'S, 118°17'E (175 km north of Port Hedland, Western Australia), 200–204 m depth, coll. by J. R. Paxton and M. McGrouther, RV SOELA, 2 Apr. 1982; CSIRO CA 426 (1), 143 mm SL, 15°07'S–15°09'S, 121°40'E–121°39'E (northwest of Cape Leveque, Western Australia), 204–210 m depth, coll. by CSIRO, demersal trawl, RV COURAGEOUS, 27 June 1978; CSIRO CA 1782 (1), 1784 (1) 110–125 mm SL, 10°02'S, 130°03'E–130°01'E (north of Bathurst Islands, Arafura Sea, Northern Territory), 216 m depth, coll. by CSIRO, demersal trawl, RV SOELA, 8 July 1980; CSIRO H 4085-02 (1), 136 mm SL, 19°01.2'S–19°01.2'S, 117°20.9'E–117°22.7'E (North of Cape Lambert, Western Australia), 165–170 m depth, coll. by A. Graham and G. Yearsley, demersal trawl, RV SOUTHERN SURVEYOR, 30 Aug. 1995; CSIRO H 5188-18 (4), 127–159 mm SL, collected with holotype; NSMT-P 59934 (9), 103–113 mm SL, 9°17'S, 131°48'E (Arafura Sea), 206 m depth, coll. by P. J. Kailola, trawl, RV SOELA, 3 July 1981; NTM S. 12902-002 (6), 77.8–121 mm SL, 9°19'S, 132°49'E (off Cape Don, Arafura Sea), 143 m depth, coll. by R. Williams, 7 Nov. 1990; NTM S. 13579-009 (5), 88.6–134 mm SL, 9°00.1'S 133°19.7'E (Arafura Sea), 193–195 m depth, coll. by R. Williams, 20 Oct. 1992; NTM S. 13580-018 (2), 117–141 mm SL, male, 9°04.7'S, 133°04.7'E (Arafura Sea), 179–205 m depth, coll. by R. Williams, 20 Oct. 1992; WAM P.26795-001 (2), 141 mm SL, 15°08'S 121°40'E (190 km off Cape Leveque, Western Australia), coll. by K. Sainsbury, 26 June 1978.

Diagnosis.—A species of *Malakichthys* with the following combination of characters: no paired spines on chin; anal-fin rays III, 8; gill rakers on lower arm 20–22; lateral-line

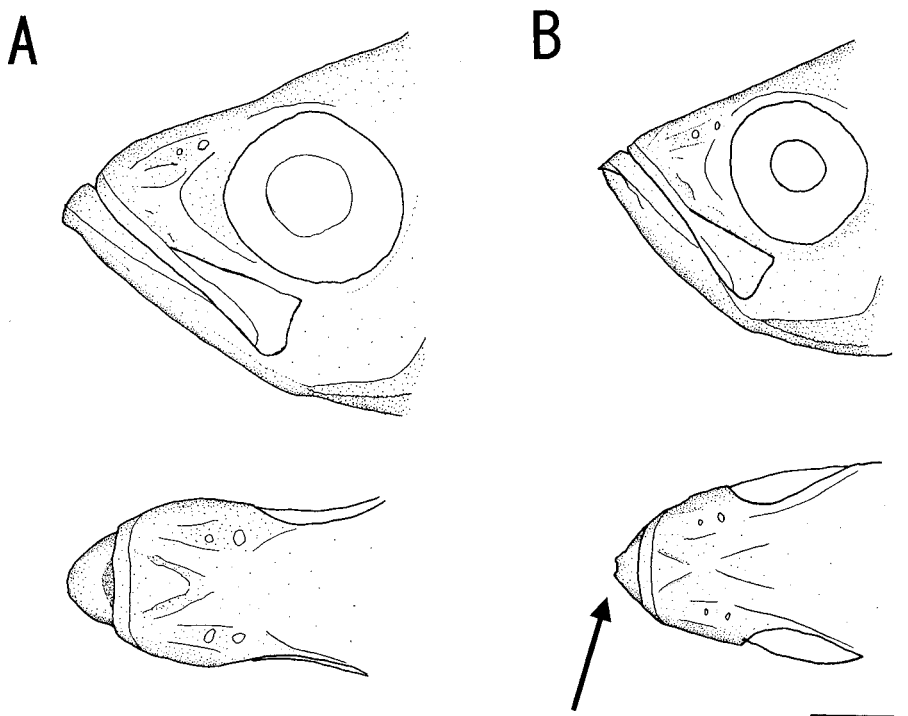


Figure 2. Lateral and dorsal views of head. A: *Malakichthys levis* (paratype, CSIRO H 5188-18, 141 mm SL); B: *Malakichthys elegans* (NSMT-P 59097, 109 mm SL, Mimase Fishing Harbor, Shikoku, Japan, 6 Jan. 2000). Arrow indicates a pair of spines on chin. Bar indicates 10 mm.

scales 49–53; transverse scale rows above the lateral line 6–7; body depth 26–32% SL; proximal-middle radial of first anal-fin pterygiophore with a cone-shaped hollow with no lamellar septum.

Description.—Paratype data are given in parentheses if different from holotype; all measurements are given as percentages of standard length. Dorsal-fin rays IX-I, 10 (9–10); anal-fin rays III, 8; pectoral-fin rays 14; pelvic-fin rays I, 5; scales on lateral line 52 (49–53); scales above lateral line 6 (6–7); scales below lateral line 14 (13–16); gill rakers 9 (8–10)+1+21 (20–22); often including one or two rudiments near dorsal and ventral ends of gill arches; head width 16 (13–16); snout length 9.9 (9.0–12); postorbital length of head 16 (14–17); bony interorbital width 6.9 (6.1–7.6); length of orbit 12 (9.6–12); upper jaw length 16 (15–17); lower jaw length 20 (19–21); body depth 29 (26–31); snout to origin of dorsal fin 39 (37–41); snout to origin of anal fin 70 (67–73); snout to origin of pectoral fin 35 (33–37); snout to origin of pelvic fin 40 (36–42); snout to anus 62 (58–65); length of dorsal-fin base 38 (38–41); length of anal fin base 14 (12–15); length of 3rd dorsal-fin spine 15 (14–19); length of 4th dorsal-fin spine 15 (14–19); length of 3rd anal-fin spine 9.8 (9.2–12); length of longest dorsal-fin soft ray 11 (12–15); length of longest anal soft ray 11 (9.7–13); length of longest pectoral-fin ray 25 (22–27); length of pelvic spine 11 (11–14); head length 37 (35–38); depth of head 27 (24–29); caudal-peduncle depth 9.9 (9.0–12); caudal-peduncle length 21 (20–25).

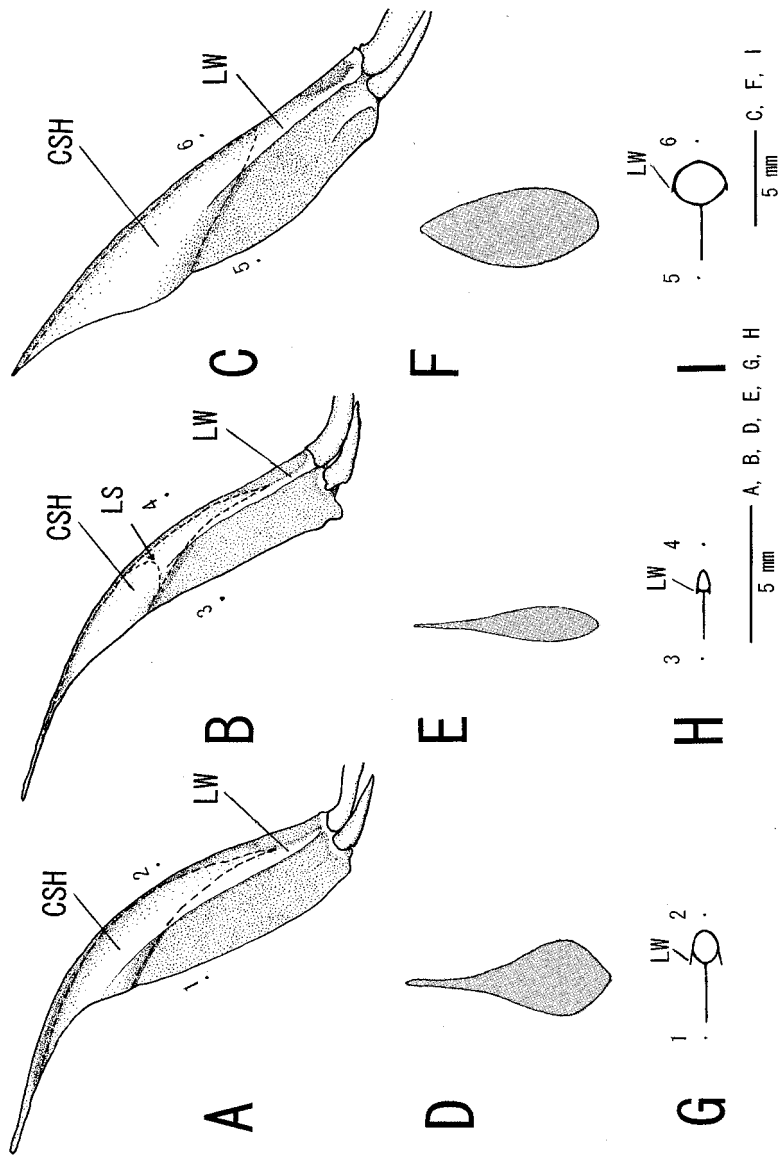


Figure 3. Proximal-middle radials of first anal-fin pterygiophore. A, D, G: *Malakichthys levis* (paratype, NTM S.12902-002, 121 mm SL); B, E, H: *M. mochizuki* (paratype, NTM S.11754-006, 122 mm SL); C, F, I: *M. elegans* (FUMT-P 20346, 151 mm SL, Suruga Bay, Japan 18 Nov. 1982). A, B, C: lateral views; D, E, F: anterior views of shape of mouth of hollows; G, H, I: cross section from 1 to 2 in A, 3 to 4 in B and 5 to 6 in C; CSH: Cone-shaped hollow; LS: lamellar septum; LW: lateral wing. Bars indicate 5 mm.

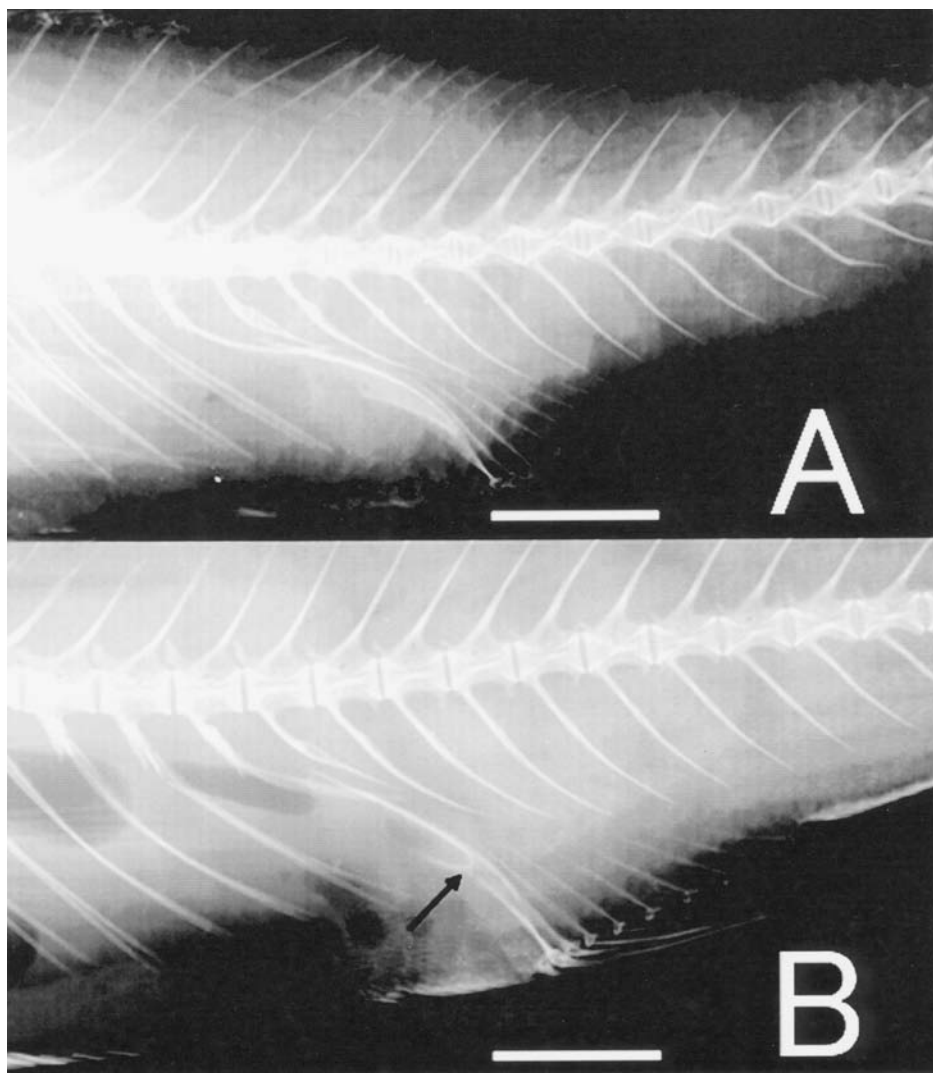


Figure 4. Radiographs of proximal-middle radial of first anal-fin pterygiophore. A: *Malakichthys levis* (paratype, NSMT-P 59934, 113 mm SL) and B: *M. mochizuki* (paratype, NTM S.11755-015, 122 mm SL). Arrow shows lamellar septum. Bars indicate 10 mm.

Body moderately elongate, compressed, and covered with deciduous ctenoid scales. Head and cheek scaled. Mouth oblique and reaching to below pupil. Villiform teeth in band on upper and lower jaws. Canines absent. Villiform teeth also on vomer and palatine. No paired spines on chin (Fig. 2A). Preopercle with double edges, posterior edge serrated; opercle with two weak spines and membranous edge. Nostrils close to each other.

Spinous and soft portions of dorsal fin separated; 3rd dorsal fin spine often longest. Caudal fin deeply forked.

Proximal-middle radial of first anal-fin pterygiophore with a cone-shaped hollow extending nearly to base of pterygiophore with no lamellar septum (Fig. 3A,D,G). Hollow encloses posterior part of swim bladder. Lateral wing well developed on shaft portion of

proximal-middle radial of first anal-fin pterygiophore and curved anteriorly. Anterodorsal tip of proximal-middle radial elongated.

Color in Alcohol.—Dorsal half of body bright yellow or brown, ventral half yellow or silver. Membrane of spinous portion of dorsal fin translucent sometimes with black margin. Soft rays of anal, pectoral and pelvic fins translucent with black pigmentation.

Etymology.—The specific name is derived from Latin *levis* meaning 'beardless' in reference to the chin no tooth-like spines.

Remarks.—We synonymized *Malakichthys* sp. of Gloerfelt-Tarp and Kailola (1984) and Sainsbury et al. (1985) with this species based on their short descriptions and photographs. However, the voucher specimens (WAM P.26208-019) of Gloerfelt-Tarp and Kailola (1984) do not agree with their description and represent a different species, *M. griseus*.

Distribution.—This species is recorded from the region between Cape Arnhem and North West Cape in north and northwest Australia (Fig. 5; Gloerfelt-Tarp and Kailola, 1984; Sainsbury et al., 1985).

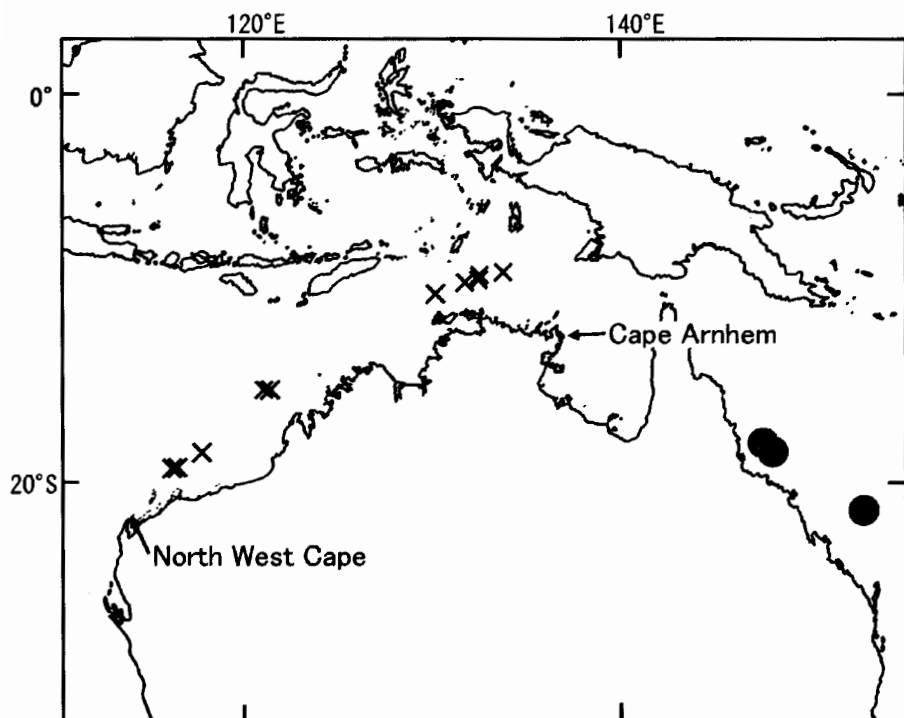


Figure 5. Collection localities of specimens used in the present study (X = *Malakichthys levis*, ● = *M. mochizuki*).

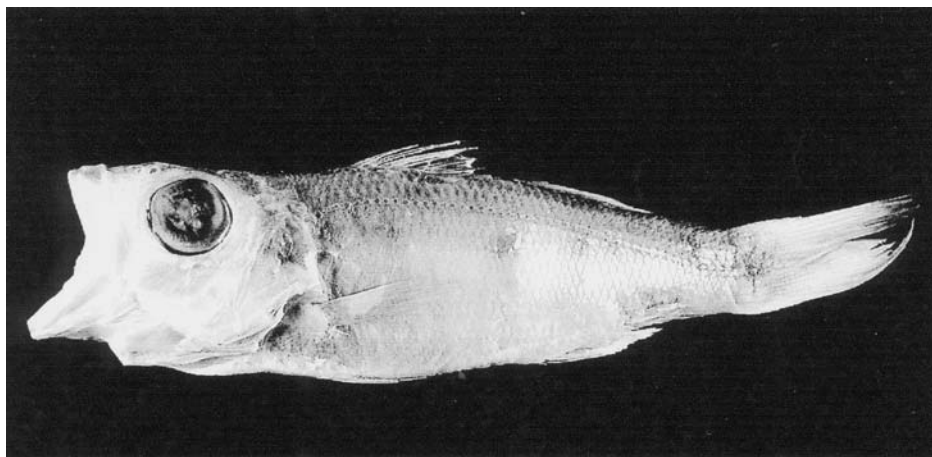


Fig. 6. Lateral view of *Malakichthys mochizuki* (holotype, QM I. 32150, 108 mm SL).

***Malakichthys mochizuki* new species**
(Figs. 3B,E,H,4B,6)

Holotype.—QM I. 32150 (formerly QM I. 15799), 108 mm SL, 18°03'S, 147°10'E (east of Hinchinbrook Island, Queensland), 320–360 m depth, 27 Nov. 1979.

Paratypes.—Total 22 specimens. All from Coral Sea: NTM S.11755-015 (5 specimens), 117–140 mm SL, 17°58'S, 147°04'E (east of Dunk Island), coll. by H. K. Larson and party, 11 Jan. 1986; NTM S.11754-006 (5), 108–131 mm SL, collected with NTM S.11755-015; QM I. 15799 (1), 113 mm SL, collected with holotype; QM I. 25299 (11), 80.3–105 mm SL, 21°21'S, 153°05'E (off Swain reefs), 300 m depth, Apr. 1988.

Diagnosis.—A species of *Malakichthys* with the following combination of characters: no paired spines on the chin; anal-fin rays III, 8; lateral-line scales 50–52; gill rakers on lower arm 23–25; transverse scale rows above lateral line 4–5; body depth 25–30% SL, proximal-middle radial of first anal-fin pterygiophore with cone-shaped hollow partitioned by a lamellar septum.

Description.—Paratype data are given in parentheses if different from holotype; all measurements are given as percentages of standard length. Dorsal-fin rays IX-I, 10; anal-fin rays III, 8; pectoral-fin rays 14; pelvic-fin rays I, 5; scales on lateral line 51 (50–52); scales above lateral line 4 (4–5); scales below lateral line 13 (13–16); gill rakers 9 (9–11) +1+23 (23–25); often including one or two rudiments near dorsal and ventral ends of gill arches; head length 37 (34–38); depth of head 28 (24–28); head width 16 (13–16); snout length 11 (8.8–11); postorbital length of head 15 (14–17); bony interorbital width 6.7 (6.1–7.3); length of orbit 12 (11–13); upper jaw length 18 (16–18); lower jaw length 20 (19–21); body depth 30 (26–31); snout to origin of dorsal fin 38 (37–41); snout to origin of anal fin 69 (66–71); snout to origin of pectoral fin 37 (31–37); snout to origin of pelvic fin 36 (35–42); snout to anus 62 (57–63); length of dorsal-fin base 40 (38–42); length of anal-fin base 14 (12–15); length of 3rd dorsal-fin spine 17 (16); length of 4th dorsal-fin spine 17 (14–17); length of 3rd anal-fin spine 11 (11–13); length of longest dorsal-fin soft ray 13 (12–14); length of longest anal-fin soft ray 10 (9.1–12); length of longest pectoral-

fin ray 23 (20–25); length of pelvic-fin spine 11 (9.6–12); caudal-peduncle depth 11 (10–11); caudal-peduncle length 23 (22–26).

Proximal-middle radial of first anal-fin pterygiophore with cone-shaped hollow partitioned by a lamellar septum into upper and lower parts (Fig. 3B,E,H); the upper part cone-shaped part encloses the posterior part of swim bladder; the lower part is an empty space, closed by lamellar septum. Lateral wing not well developed on shaft portion of proximal-middle radial. Anterodorsal tip of proximal-middle radial elongated. Other morphological characters are very similar to *M. levis*.

Color in Alcohol.—Dorsal half of body brown, lower half silver. Spines and soft fin rays of all fins translucent with black pigmentation on fin rays.

Etymology.—The specific epithet is in honor of Kenji Mochizuki (CBM) who kindly made his own data and specimens of acropomatids available to us. The name is treated as a noun in apposition.

Distribution.—This species is recorded from the Coral Sea, along the northeastern coast of Australia (Fig. 5).

COMPARISONS

The two new species differ from all other species of *Malakichthys* in lacking paired spines on the chin (Fig. 2). However, their allocation to *Malakichthys* (rather than other genera of acropomatids) is supported by the following characters unique to the genus: no canine teeth (pers. observ.); 10 dorsal-fin spines, 3 anal-fin spines, and anus near the origin of anal fin (Katayama, 1960; Gloerfelt-Tarp and Kailola, 1984).

Although the two new species are similar to each other, they are differentiated by the number of gill rakers on the lower arm (20–22 in *M. levis*, 23–25 in *M. mochizuki*), the transverse scale rows above the lateral line scales (6–7 in *M. levis*, 4–5 in *M. mochizuki*) and the shape of the proximal-middle radial of first anal-fin pterygiophore (not partitioned in *M. levis*, partitioned in *M. mochizuki*).

The proximal-middle radials of first anal-fin pterygiophore in the two new species are similar to that of *Malakichthys elegans* in having a cone-shaped hollow enclosing the posterior part of the swim bladder (Fig. 3). *M. levis* has a non-partitioned ordinary hollow like *M. elegans* and the swim bladder reaches to the end of the hollow. *M. mochizuki* has the hollow partitioned by the lamellar septum. The swim bladder terminates at the lamellar septum and the lower of proximal middle radial of first anal-fin pterygiophore part is hollowed. This difference is clearly revealed by radiographs (Fig. 4).

The dorsal tip of proximal-middle radial of first anal-fin pterygiophore is more elongated in *M. levis* and *M. mochizuki* than that in *M. elegans*. In *M. levis*, the lateral wing of the proximal-middle radial is well developed. In *M. mochizuki*, as well as *M. elegans*, the lateral wing is not well developed.

Malakichthys levis is recorded from the Arafura Sea and eastern Indian Ocean along the north western coast of Australia in 100–200 m, *M. mochizuki* is recorded from the Coral Sea along the north eastern coast of Australia at about 300 m.

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